Marine Pollution Bulletin 92 (2015) 222–226

Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

Baseline

Edited by Bruce J. Richardson

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Assessment of swimming associated health effects in marine bathing beach: An example from Morib beach (Malaysia)

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ARTICLE INFO

Article history:
Available online 16 January 2015

Keywords:
Beach
Recreational activities
Water exposure
Health effects

ABSTRACT

A survey among beachgoers was conducted to determine the swimming associated health effects experienced and its relationship with beach water exposure behaviour in Morib beach. For beach water exposure behaviour, the highest frequency of visit among the respondents was once a year (41.9%). For ways of water exposure, whole body exposure including head was the highest (38.5%). For duration of water exposure, 30.8% respondents prefer to be in water for about 30 min with low possibilities of accidental ingestion of beach water. A total of 30.8% of beachgoers in Morib beach were reported of having dermal symptoms. Bivariate analysis showed only water activity, water contact and accidental ingestion of beach water showed significant association with swimming associated health effects experienced by swimmers. This study output showed that epidemiological study can be used to identify swimming associated health effects in beach water exposed to faecal contamination.

Faecal contamination occurs as faecal materials from human, animals and birds were discharged to the environment every year. These faecal materials reach water bodies such as surface water or beach either directly or indirectly. Pathogenic microbes which are carried by these faecal materials may pose risks to human exposed to these water bodies (Dufour et al., 2012). Studies have shown that faecal contamination increases perceived health risks among beachgoers (Praveena et al., 2013; Byappanahalli et al., 2008). Faecal coliforms, enterococci and faecal streptococci are the most often used faecal contamination indicators in beach water studies. Moreover, contamination of water by human, animals and birds cannot be distinguished by using these faecal contamination indicators. Thus, the extent of human health risks were considered to be the same for all water regardless of the source.

Various research efforts have been going on to developed new methods to identify sources of faecal contamination by Santo Domingo et al. (2007), Rochelle and De Leon (2006) and United States Environmental Protection Agency (2005). These methods are more specific water quality measurements using gene-based techniques. Chromogenic substrate assays using gene-based technique are a new tool to measure pathogen directly, rapidly and easier than the traditional methods. However, chromogenic substrate assays are not commercially available although it is capable to obtain prompt results (Colford et al., 2007). To date, none of these methods developed can be applied to characterize perceived health risks among beachgoers. In the absence of effective faecal contamination sources identification method, epidemiological study can be used to identify perceived health risks among beachgoers in locations especially in beach water exposed to faecal contamination (Dufour et al., 2012). Regardless of cost, efficacy and rapidity, epidemiological study can be designed to identify per-

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http://dx.doi.org/10.1016/j.marpolbul.2015.01.003
0025-326X/

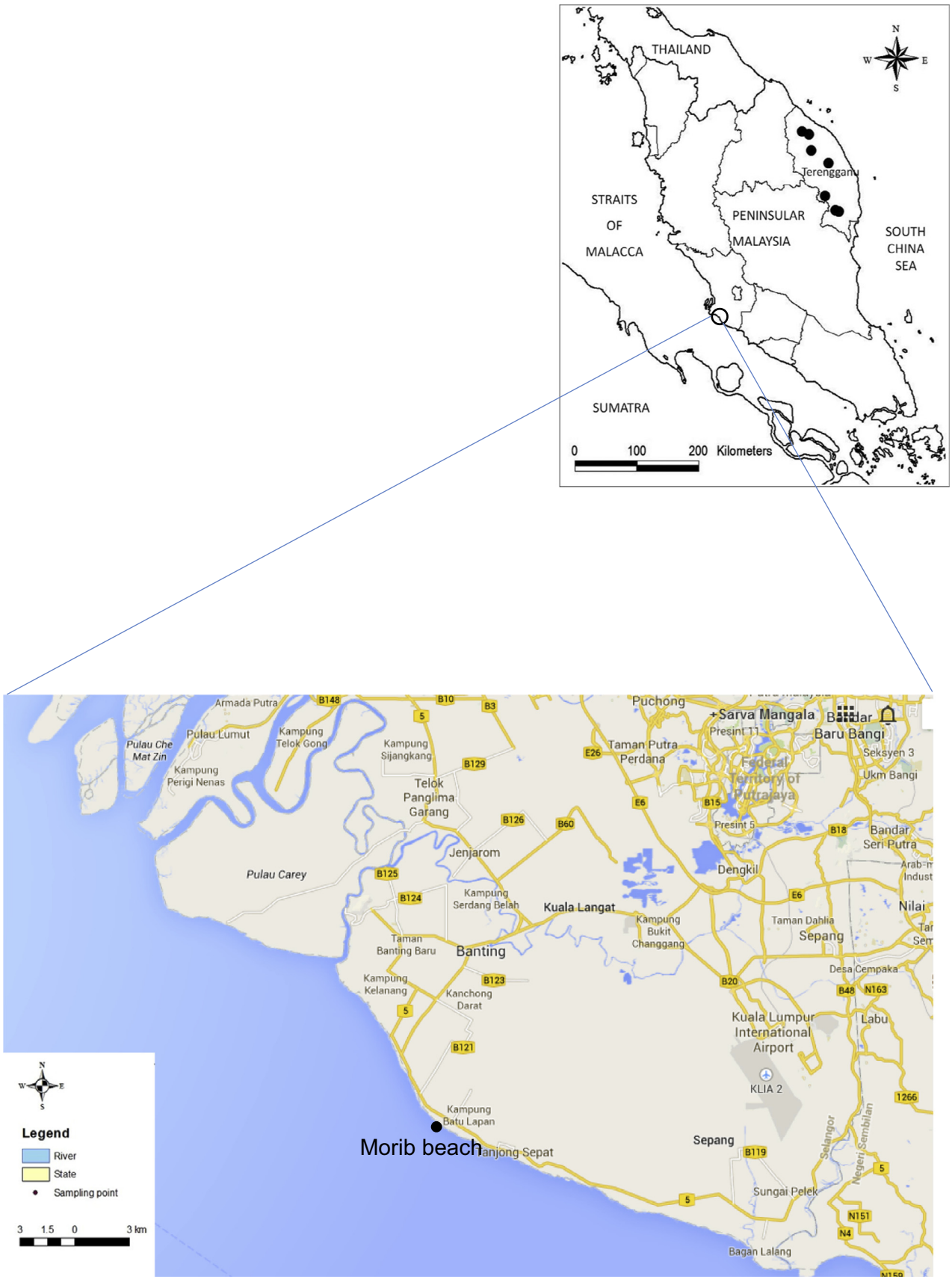

Fig. 1. Morib beach, the closest sandy beach found at the southern end of Selangor (Malaysia).